CLAIMS

What is claimed is:

1. A device for modulating a carrier signal comprising:

(a) a mapper generating a first data signal at a selected one of a plurality of baud rates;

(b) a scaler multiplying the first data signal by one of a plurality of predetermined scaler values selected to correspond to the baud rate to generate a scaled data signal;

(c) a complex mixer for generating a frequency shifting scaled data signal;

(d) an upsampler circuit for increasing the sampling frequency of the frequency shifted scaled data signal; and

(e) a pulse shaper circuit for generating a digital representation of a modulated carrier signal in accordance with the frequency shifted scaled data signal.

2. The device for modulating a carrier signal of claim 1, wherein the first data signal comprises an I-channel first data signal and a Q-channel first data signal, the scaled data signal comprises an I-channel scaled data signal and a Q-channel scaled data signal, and the frequency shifted scaled data signal comprises an I-channel frequency shifted scaled data signal and a Q-channel frequency shifted scaled data signal.

3. The device for modulating a carrier signal of claim 2, wherein the first data signal is a digital data signal with a sampling frequency corresponding to the highest of the plurality of baud rates.

4. The device for modulating a carrier signal of claim 3, wherein each of the predetermined scaler values is a value which provides for the scaled data signal to have approximately the same signal strength independent of baud rate.

5. The device for modulating a carrier signal of claim 4, wherein the complex mixer includes:

(i) a first multiplier and a second multiplier each multiplying the I-channel scaled data signal by a sine waveform and a cosine waveform respectively;

(ii) a third and fourth multiplier each multiplying the Q-channel scaled data signal by the sine waveform and a cosine waveform respectively;

(iii) a first summer adding the result of the second multiplier to the result of the third multiplier multiplied by negative one to generate the I-channel frequency shifted scaled data signal; and

(iv) a second channel summer adding the result of the first multiplier and the result of the fourth multiplier to generate the Q-channel frequency shifted scaled data signal.

6. The device for modulating a carrier signal of claim 5, wherein the sine waveform and the cosine waveform each have a frequency of one fourth the sampling frequency.

7. The device for modulating a carrier signal of claim 6, wherein the pulse shaper circuit includes a finite impulse response filter and a coefficient matrix storing a set of coefficients for each of the I-channel and the Q-channel.

8. The device for modulating a carrier signal of claim 7, wherein the plurality of baud rates are 2 Mbaud and 4 Mbaud and the sampling frequency is 4 MHz.

9. The device for modulating a carrier signal of claim 8, wherein the predetermined scaler values are a value of 1 corresponding to the 2 Mbaud baud rate and a value of 2/3 corresponding to the 4 Mbaud baud rate.
complex

10. The device for modulating a carrier signal of claim 9, wherein the finite impulse response filter is a 16 tap finite impulse filter and each set of filter coefficients includes 9 non-zero coefficients, each coefficient being a 10 bit coefficient.

11. A method for modulating a carrier signal, the method comprising:

(a) generating a first data signal at a selected one of a plurality of baud rates;

(b) scaling the first data signal by one of a plurality of predetermined scaler values selected to correspond to the baud rate to generate a scaled data signal;

(c) mixing the scaled data signal with a frequency signal to generate a frequency shifted scaled data signal;

(d) increasing the sampling frequency of the frequency shifted scaled data signal; and

(e) filtering the frequency shifted scaled data signal to generate a digital representation of a modulated carrier signal.

12. The method for modulating a carrier signal of claim 11, wherein the step of generating the first data signal comprises generating an I-channel first data signal and a Q-channel first data signal, the step of scaling the first data signal comprises scaling the I-channel first data signal and the Q-channel first data signal, and the step of mixing the scaled data signal includes complex mixing of both the I-channel scaled data signal and the Q-channel scaled data signal.

13. The method for modulating a carrier signal of claim 12, wherein the first data signal is a digital data signal with a sampling frequency corresponding to the highest of the plurality of baud rates.

14. The method for modulating a carrier signal of claim 13, wherein each of the predetermined scaler values is a value which provides for the scaled data signal to have approximately the same signal strength independent of baud rate.

15. The method for modulating a carrier signal of claim 14, wherein the step of complex mixing the scaled data signal includes:

(i) subtracting the result of the Q-channel scaled data signal multiplied by a sine waveform from the result of the I-channel scaled data signal multiplied by a cosine waveform to generate an I-channel frequency shifted data signal; and

(ii) adding the result of the Q-channel scaled data signal multiplied by a cosine waveform from the result of the I-channel scaled data signal multiplied by a sine waveform to generate a Q-channel frequency shifted data signal.

16. The method for modulating a carrier signal of claim 15, wherein the sine waveform and the cosine waveform each have a frequency of one fourth the sampling frequency.

17. The method for modulating a carrier signal of claim 16, wherein the step of filtering the frequency shifted scaled data signal includes 16 tap finite impulse response filtering utilizing a set of predetermined filter coefficients for each of the I-channel and the Q-channel.

18. The method for modulating a carrier signal of claim 17, wherein the plurality of baud rates are 2 Mbaud and 4 Mbaud and the sampling frequency is 4 MHz.

19. The method for modulating a carrier signal of claim 18, wherein the predetermined scaler values are a value of 1 corresponding to the 2 Mbaud baud

rate and a value of 2/3 corresponding to the 4 Mbaud baud rate.
complex

20. The method for modulating a carrier signal of claim 19, wherein each set of filter coefficients includes 9 non-zero coefficients, each coefficient being a 10 bit coefficient.